SEQUENCE LISTING

<110> SYKEN, JOSH
MUNGER, KARL

<120> METHODS AND REAGENTS TO REGULATE APOPTOSIS

<130> HMV-054.01

<140> 09/908,992
<141> 2001-07-19

<150> 60/219,718
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<170> PatentIn Ver. 2.1

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Gly Arg Gly Ala Arg Pro Pro Arg Glu Gly Val Val Gly Ala Trp Leu
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agc cgc aag ctg agc gtc ccc gcc ttt gcg tct tcc ctg acc tct tgc   196
Ser Arg Lys Leu Ser Val Pro Ala Phe Ala Ser Ser Leu Thr Ser Cys
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ggc ccc cga gcg ctg ctg aca ttg aga cct ggt gtc agc ctt aca gga   244
Gly Pro Arg Ala Leu Leu Thr Leu Arg Pro Gly Val Ser Leu Thr Gly
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Thr Lys His Asn Pro Phe Ile Cys Thr Ala Ser Phe His Thr Ser Ala
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cct ttg gcc aaa gaa gat tat tat cag ata tta gga gtg cct cga aat   340
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Tyr His Pro Asp Thr Asn Lys Asp Asp Pro Lys Ala Lys Glu Lys Phe
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tcc cag ctg gca gaa gcc tat gag gtt ttg agt gat gag gtg aag agg   484
Ser Gln Leu Ala Glu Ala Tyr Glu Val Leu Ser Asp Glu Val Lys Arg
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aag cag tac gat gcc tac ggc tct gca ggc ttc gat cct ggg gcc agc   532
Lys Gln Tyr Asp Ala Tyr Gly Ser Ala Gly Phe Asp Pro Gly Ala Ser
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ggc tcc cag cat agc tac tgg aag gga ggc ccc act gtg gac ccc gag   580
Gly Ser Gln His Ser Tyr Trp Lys Gly Gly Pro Thr Val Asp Pro Glu
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gag ctg ttc agg aag atc ttt ggc gag ttc tca tcc tct tca ttt gga   628
Glu Leu Phe Arg Lys Ile Phe Gly Glu Phe Ser Ser Ser Ser Phe Gly
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gat ttc cag acc gtg ttt gat cag cct cag gaa tac ttc atg gag ttg   676
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aca ttc aat caa gct gca aag ggg gtc aac aag gag ttc acc gtg aac   724
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atc atg gac acg tgt gag cgc tgc aac ggc aag ggg aac gag ccc ggc   772
Ile Met Asp Thr Cys Glu Arg Cys Asn Gly Lys Gly Asn Glu Pro Gly
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acc aag gtg cag cat tgc cac tac tgt ggc ggc tcc ggc atg gaa acc   820
Thr Lys Val Gln His Cys His Tyr Cys Gly Gly Ser Gly Met Glu Thr
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atc aac aca ggc cct ttt gtg atg cgt tcc acg tgt agg aga tgt ggt   868
Ile Asn Thr Gly Pro Phe Val Met Arg Ser Thr Cys Arg Arg Cys Gly
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ggc cgc ggc tcc atc atc ata tcg ccc tgt gtg gtc tgc agg gga gca   916
Gly Arg Gly Ser Ile Ile Ile Ser Pro Cys Val Val Cys Arg Gly Ala
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gga caa gcc aag cag aaa aag cga gtg atg atc cct gtg cct gca gga   964
Gly Gln Ala Lys Gln Lys Lys Arg Val Met Ile Pro Val Pro Ala Gly
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gtc gag gat ggc cag acc gtg agg atg cct gtg gga aaa agg gaa att   1012
Val Glu Asp Gly Gln Thr Val Arg Met Pro Val Gly Lys Arg Glu Ile
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ttc att acg ttc agg gtg cag aaa agc cct gtg ttc cgg agg gac ggc   1060
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atc ccc cct ggg act cag aca gac cag aag att cgg atg ggt ggg aaa   1204
Ile Pro Pro Gly Thr Gln Thr Asp Gln Lys Ile Arg Met Gly Gly Lys
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ggc atc ccc cgg att aac agc tac ggc tac gga gac cac tac atc cac   1252
Gly Ile Pro Arg Ile Asn Ser Tyr Gly Tyr Gly Asp His Tyr Ile His
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atc aag ata cga gtt cca aag agg cta acg agc cgg cag cag agc ctg   1300
Ile Lys Ile Arg Val Pro Lys Arg Leu Thr Ser Arg Gln Gln Ser Leu
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atc ctg agc tac gcc gag gac gag aca gat gtg gag ggg acg gtg aac   1348
Ile Leu Ser Tyr Ala Glu Asp Glu Thr Asp Val Glu Gly Thr Val Asn
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ggc gtc acc ctc acc agc tct ggt ggc agc acc atg gat agc tcc gca   1396
Gly Val Thr Leu Thr Ser Ser Gly Gly Ser Thr Met Asp Ser Ser Ala
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gga agc aag gct agg cgt gag gct ggg gag gac gag gag gga ttc ctt   1444
Gly Ser Lys Ala Arg Arg Glu Ala Gly Glu Asp Glu Glu Gly Phe Leu
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tcc aaa ctt aag aaa atg ttt acc tca tgatatccca gccgaggaaa         1491
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ccg cgg ctg ccg gct ata tcg ggt aga ggg gcc cgg ccg ccc agg gag   96
Pro Arg Leu Pro Ala Ile Ser Gly Arg Gly Ala Arg Pro Pro Arg Glu
             20                  25                  30

ggc gtg gtg ggg gca tgg ctg agc cgc aag ctg agc gtc ccc gcc ttt   144
Gly Val Val Gly Ala Trp Leu Ser Arg Lys Leu Ser Val Pro Ala Phe
         35                  40                  45

gcg tct tcc ctg acc tct tgc ggc ccc cga gcg ctg ctg aca ttg aga   192
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gcc tcc ttc cac acg agt gcc cct ttg gcc aaa gaa gat tat tat cag   288
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ata tta gga gtg cct cga aat gcc agc cag aaa gag atc aag aaa gcc   336
Ile Leu Gly Val Pro Arg Asn Ala Ser Gln Lys Glu Ile Lys Lys Ala
            100                 105                 110

tat tat cag ctt gcc aag aag tat cac cct gac aca aat aag gat gat   384
Tyr Tyr Gln Leu Ala Lys Lys Tyr His Pro Asp Thr Asn Lys Asp Asp
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ccc aaa gcc aag gag aag ttc tcc cag ctg gca gaa gcc tat gag gtt   432
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ggc ccc act gtg gac ccc gag gag ctg ttc agg aag atc ttt ggc gag   576
Gly Pro Thr Val Asp Pro Glu Glu Leu Phe Arg Lys Ile Phe Gly Glu
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cag gaa tac ttc atg gag ttg aca ttc aat caa gct gca aag ggg gtc   672
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aac aag gag ttc acc gtg aac atc atg gac acg tgt gag cgc tgc aac   720
Asn Lys Glu Phe Thr Val Asn Ile Met Asp Thr Cys Glu Arg Cys Asn
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ggc aag ggg aac gag ccc ggc acc aag gtg cag cat tgc cac tac tgt   768
Gly Lys Gly Asn Glu Pro Gly Thr Lys Val Gln His Cys His Tyr Cys
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ggc ggc tcc ggc atg gaa acc atc aac aca ggc cct ttt gtg atg cgt   816
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Ser Thr Cys Arg Arg Cys Gly Gly Arg Gly Ser Ile Ile Ile Ser Pro
        275                 280                 285

tgt gtg gtc tgc agg gga gca gga caa gcc aag cag aaa aag cga gtg   912
Cys Val Val Cys Arg Gly Ala Gly Gln Ala Lys Gln Lys Lys Arg Val
    290                 295                 300

atg atc cct gtg cct gca gga gtc gag gat ggc cag acc gtg agg atg   960
Met Ile Pro Val Pro Ala Gly Val Glu Asp Gly Gln Thr Val Arg Met
305                 310                 315                 320

cct gtg gga aaa agg gaa att ttc att acg ttc agg gtg cag aaa agc  1008
Pro Val Gly Lys Arg Glu Ile Phe Ile Thr Phe Arg Val Gln Lys Ser
                325                 330                 335

cct gtg ttc cgg agg gac ggc gca gac atc cac tcc gac ctc ttt att  1056
Pro Val Phe Arg Arg Asp Gly Ala Asp Ile His Ser Asp Leu Phe Ile
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tct ata gct cag gct ctt ctt ggg gga aca gcc aga gcc cag ggc ctg  1104
Ser Ile Ala Gln Ala Leu Leu Gly Gly Thr Ala Arg Ala Gln Gly Leu
        355                 360                 365

tac gag acg atc aac gtg acg atc ccc cct ggg act cag aca gac cag  1152
Tyr Glu Thr Ile Asn Val Thr Ile Pro Pro Gly Thr Gln Thr Asp Gln
    370                 375                 380

aag att cgg atg ggt ggg aaa ggc atc ccc cgg att aac agc tac ggc  1200
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Tyr Gly Asp His Tyr Ile His Ile Lys Ile Arg Val Pro Lys Arg Leu
                405                 410                 415

acg agc cgg cag cag agc ctg atc ctg agc tac gcc gag gac gag aca   1296
Thr Ser Arg Gln Gln Ser Leu Ile Leu Ser Tyr Ala Glu Asp Glu Thr
            420                 425                 430

gat gtg gag ggg acg gtg aac ggc gtc acc ctc acc agc tct ggt ggc   1344
Asp Val Glu Gly Thr Val Asn Gly Val Thr Leu Thr Ser Ser Gly Gly
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agc acc atg gat agc tcc gca gga agc aag gct agg cgt gag gct ggg   1392
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gag gac gag gag gga ttc ctt tcc aaa ctt aag aaa atg ttt acc tca   1440
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ccg cgg ctg ccg gct ata tcg ggt aga ggg gcc cgg ccg ccc agg gag   96
Pro Arg Leu Pro Ala Ile Ser Gly Arg Gly Ala Arg Pro Pro Arg Glu
            20                  25                  30

ggc gtg gtg ggg gca tgg ctg agc cgc aag ctg agc gtc ccc gcc ttt   144
Gly Val Val Gly Ala Trp Leu Ser Arg Lys Leu Ser Val Pro Ala Phe
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gcg tct tcc ctg acc tct tgc ggc ccc cga gcg ctg ctg aca ttg aga   192
Ala Ser Ser Leu Thr Ser Cys Gly Pro Arg Ala Leu Leu Thr Leu Arg
    50                  55                  60

cct ggt gtc agc ctt aca gga aca aaa cat aac cct ttc att tgt act   240
Pro Gly Val Ser Leu Thr Gly Thr Lys His Asn Pro Phe Ile Cys Thr
65                  70                  75                  80

gcc tcc ttc cac acg agt gcc cct ttg gcc aaa gaa gat tat tat cag   288
Ala Ser Phe His Thr Ser Ala Pro Leu Ala Lys Glu Asp Tyr Tyr Gln
                85                  90                  95

ata tta gga gtg cct cga aat gcc agc cag aaa gag atc aag aaa gcc   336
Ile Leu Gly Val Pro Arg Asn Ala Ser Gln Lys Glu Ile Lys Lys Ala
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tat tat cag ctt gcc aag aag tat cac cct gac aca aat aag gat gat   384
Tyr Tyr Gln Leu Ala Lys Lys Tyr His Pro Asp Thr Asn Lys Asp Asp
        115                 120                 125

ccc aaa gcc aag gag aag ttc tcc cag ctg gca gaa gcc tat gag gtt   432
Pro Lys Ala Lys Glu Lys Phe Ser Gln Leu Ala Glu Ala Tyr Glu Val
    130                 135                 140

ttg agt gat gag gtg aag agg aag cag tac gat gcc tac ggc tct gca   480
Leu Ser Asp Glu Val Lys Arg Lys Gln Tyr Asp Ala Tyr Gly Ser Ala
145                 150                 155                 160

ggc ttc gat cct ggg gcc agc ggc tcc cag cat agc tac tgg aag gga   528
Gly Phe Asp Pro Gly Ala Ser Gly Ser Gln His Ser Tyr Trp Lys Gly
                165                 170                 175

ggc ccc act gtg gac ccc gag gag ctg ttc agg aag atc ttt ggc gag   576
Gly Pro Thr Val Asp Pro Glu Glu Leu Phe Arg Lys Ile Phe Gly Glu
            180                 185                 190

ttc tca tcc tct tca ttt gga gat ttc cag acc gtg ttt gat cag cct   624
Phe Ser Ser Ser Ser Phe Gly Asp Phe Gln Thr Val Phe Asp Gln Pro
        195                 200                 205

cag gaa tac ttc atg gag ttg aca ttc aat caa gct gca aag ggg gtc   672
Gln Glu Tyr Phe Met Glu Leu Thr Phe Asn Gln Ala Ala Lys Gly Val
    210                 215                 220

aac aag gag ttc acc gtg aac atc atg gac acg tgt gag cgc tgc aac   720
Asn Lys Glu Phe Thr Val Asn Ile Met Asp Thr Cys Glu Arg Cys Asn
225                 230                 235                 240

ggc aag ggg aac gag ccc ggc acc aag gtg cag cat tgc cac tac tgt   768
Gly Lys Gly Asn Glu Pro Gly Thr Lys Val Gln His Cys His Tyr Cys
                245                 250                 255

ggc ggc tcc ggc atg gaa acc atc aac aca ggc cct ttt gtg atg cgt   816
Gly Gly Ser Gly Met Glu Thr Ile Asn Thr Gly Pro Phe Val Met Arg
            260                 265                 270

tcc acg tgt agg aga tgt ggt ggc cgc ggc tcc atc atc ata tcg ccc   864
Ser Thr Cys Arg Arg Cys Gly Gly Arg Gly Ser Ile Ile Ile Ser Pro
        275                 280                 285

tgt gtg gtc tgc agg gga gca gga caa gcc aag cag aaa aag cga gtg   912
Cys Val Val Cys Arg Gly Ala Gly Gln Ala Lys Gln Lys Lys Arg Val
    290                 295                 300

atg atc cct gtg cct gca gga gtc gag gat ggc cag acc gtg agg atg   960
Met Ile Pro Val Pro Ala Gly Val Glu Asp Gly Gln Thr Val Arg Met
305                 310                 315                 320

cct gtg gga aaa agg gaa att ttc att acg ttc agg gtg cag aaa agc  1008
Pro Val Gly Lys Arg Glu Ile Phe Ile Thr Phe Arg Val Gln Lys Ser
                325                 330                 335

cct gtg ttc cgg agg gac ggc gca gac atc cac tcc gac ctc ttt att  1056
Pro Val Phe Arg Arg Asp Gly Ala Asp Ile His Ser Asp Leu Phe Ile
            340                 345                 350
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tct ata gct cag gct ctt ctt ggg gga aca gcc aga gcc cag ggc ctg   1104
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tac gag acg atc aac gtg acg atc ccc cct ggg act cag aca gac cag   1152
Tyr Glu Thr Ile Asn Val Thr Ile Pro Pro Gly Thr Gln Thr Asp Gln
    370                 375                 380

aag att cgg atg ggt ggg aaa ggc atc ccc cgg att aac agc tac ggc   1200
Lys Ile Arg Met Gly Gly Lys Gly Ile Pro Arg Ile Asn Ser Tyr Gly
385                 390                 395                 400

tac gga gac cac tac atc cac atc aag ata cga gtt cca aag agg cta   1248
Tyr Gly Asp His Tyr Ile His Ile Lys Ile Arg Val Pro Lys Arg Leu
                405                 410                 415

acg agc cgg cag cag agc ctg atc ctg agc tac gcc gag gac gag aca   1296
Thr Ser Arg Gln Gln Ser Leu Ile Leu Ser Tyr Ala Glu Asp Glu Thr
            420                 425                 430

gat gtg gag ggg acg gtg aac ggc gtc acc ctc acc agc tct gga aaa   1344
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cggatgggtg ggaaaggcat cccccggatt aacagctacg gctacggaga ccactacatc 1020
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tacgccgagg acgagacaga tgtggagggg acggtgaacg gcgtcaccct caccagctct 1140
ggaaaaagat ccactggaaa c 1161

<210> 6
<211> 99
<212> DNA
<213> Homo sapiens

<400> 6
ggcagcacca tggatagctc cgcaggaagc aaggctaggc gtgaggctgg ggaggacgag 60
gagggattcc tttccaaact taagaaaatg tttacctca 99

<210> 7
<211> 18
<212> DNA
<213> Homo sapiens

<400> 7
aaaagatcca ctggaaac 18

<210> 8
<211> 480
<212> PRT
<213> Homo sapiens

<400> 8
Met Ala Ala Arg Cys Ser Thr Arg Trp Leu Leu Val Val Val Gly Thr
1 5 10 15

Pro Arg Leu Pro Ala Ile Ser Gly Arg Gly Ala Arg Pro Pro Arg Glu
20 25 30

Gly Val Val Gly Ala Trp Leu Ser Arg Lys Leu Ser Val Pro Ala Phe
35 40 45

Ala Ser Ser Leu Thr Ser Cys Gly Pro Arg Ala Leu Leu Thr Leu Arg

```
     50                  55                  60

Pro Gly Val Ser Leu Thr Gly Thr Lys His Asn Pro Phe Ile Cys Thr
 65                  70                  75                  80

Ala Ser Phe His Thr Ser Ala Pro Leu Ala Lys Glu Asp Tyr Tyr Gln
                 85                  90                  95

Ile Leu Gly Val Pro Arg Asn Ala Ser Gln Lys Glu Ile Lys Lys Ala
            100                 105                 110

Tyr Tyr Gln Leu Ala Lys Lys Tyr His Pro Asp Thr Asn Lys Asp Asp
        115                 120                 125

Pro Lys Ala Lys Glu Lys Phe Ser Gln Leu Ala Glu Ala Tyr Glu Val
    130                 135                 140

Leu Ser Asp Glu Val Lys Arg Lys Gln Tyr Asp Ala Tyr Gly Ser Ala
145                 150                 155                 160

Gly Phe Asp Pro Gly Ala Ser Gly Ser Gln His Ser Tyr Trp Lys Gly
                165                 170                 175

Gly Pro Thr Val Asp Pro Glu Glu Leu Phe Arg Lys Ile Phe Gly Glu
            180                 185                 190

Phe Ser Ser Ser Ser Phe Gly Asp Phe Gln Thr Val Phe Asp Gln Pro
        195                 200                 205

Gln Glu Tyr Phe Met Glu Leu Thr Phe Asn Gln Ala Ala Lys Gly Val
    210                 215                 220

Asn Lys Glu Phe Thr Val Asn Ile Met Asp Thr Cys Glu Arg Cys Asn
225                 230                 235                 240

Gly Lys Gly Asn Glu Pro Gly Thr Lys Val Gln His Cys His Tyr Cys
                245                 250                 255

Gly Gly Ser Gly Met Glu Thr Ile Asn Thr Gly Pro Phe Val Met Arg
            260                 265                 270

Ser Thr Cys Arg Arg Cys Gly Gly Arg Gly Ser Ile Ile Ile Ser Pro
        275                 280                 285

Cys Val Val Cys Arg Gly Ala Gly Gln Ala Lys Gln Lys Lys Arg Val
    290                 295                 300

Met Ile Pro Val Pro Ala Gly Val Glu Asp Gly Gln Thr Val Arg Met
305                 310                 315                 320

Pro Val Gly Lys Arg Glu Ile Phe Ile Thr Phe Arg Val Gln Lys Ser
                325                 330                 335

Pro Val Phe Arg Arg Asp Gly Ala Asp Ile His Ser Asp Leu Phe Ile
            340                 345                 350

Ser Ile Ala Gln Ala Leu Leu Gly Gly Thr Ala Arg Ala Gln Gly Leu
        355                 360                 365

Tyr Glu Thr Ile Asn Val Thr Ile Pro Pro Gly Thr Gln Thr Asp Gln
    370                 375                 380
```

```
Lys Ile Arg Met Gly Gly Lys Gly Ile Pro Arg Ile Asn Ser Tyr Gly
385                 390                 395                 400

Tyr Gly Asp His Tyr Ile His Ile Lys Ile Arg Val Pro Lys Arg Leu
                405                 410                 415

Thr Ser Arg Gln Gln Ser Leu Ile Leu Ser Tyr Ala Glu Asp Glu Thr
            420                 425                 430

Asp Val Glu Gly Thr Val Asn Gly Val Thr Leu Thr Ser Ser Gly Gly
        435                 440                 445

Ser Thr Met Asp Ser Ser Ala Gly Ser Lys Ala Arg Arg Glu Ala Gly
    450                 455                 460

Glu Asp Glu Glu Gly Phe Leu Ser Lys Leu Lys Lys Met Phe Thr Ser
465                 470                 475                 480
```

<210> 9
<211> 453
<212> PRT
<213> Homo sapiens

<400> 9

```
Met Ala Ala Arg Cys Ser Thr Arg Trp Leu Leu Val Val Val Gly Thr
  1               5                  10                  15

Pro Arg Leu Pro Ala Ile Ser Gly Arg Gly Ala Arg Pro Pro Arg Glu
            20                  25                  30

Gly Val Val Gly Ala Trp Leu Ser Arg Lys Leu Ser Val Pro Ala Phe
        35                  40                  45

Ala Ser Ser Leu Thr Ser Cys Gly Pro Arg Ala Leu Leu Thr Leu Arg
    50                  55                  60

Pro Gly Val Ser Leu Thr Gly Thr Lys His Asn Pro Phe Ile Cys Thr
65                  70                  75                  80

Ala Ser Phe His Thr Ser Ala Pro Leu Ala Lys Glu Asp Tyr Tyr Gln
                85                  90                  95

Ile Leu Gly Val Pro Arg Asn Ala Ser Gln Lys Glu Ile Lys Lys Ala
            100                 105                 110

Tyr Tyr Gln Leu Ala Lys Lys Tyr His Pro Asp Thr Asn Lys Asp Asp
        115                 120                 125

Pro Lys Ala Lys Glu Lys Phe Ser Gln Leu Ala Glu Ala Tyr Glu Val
    130                 135                 140

Leu Ser Asp Glu Val Lys Arg Lys Gln Tyr Asp Ala Tyr Gly Ser Ala
145                 150                 155                 160

Gly Phe Asp Pro Gly Ala Ser Gly Ser Gln His Ser Tyr Trp Lys Gly
                165                 170                 175

Gly Pro Thr Val Asp Pro Glu Glu Leu Phe Arg Lys Ile Phe Gly Glu
            180                 185                 190
```

```
Phe Ser Ser Ser Ser Phe Gly Asp Phe Gln Thr Val Phe Asp Gln Pro
        195                 200                 205

Gln Glu Tyr Phe Met Glu Leu Thr Phe Asn Gln Ala Ala Lys Gly Val
    210                 215                 220

Asn Lys Glu Phe Thr Val Asn Ile Met Asp Thr Cys Glu Arg Cys Asn
225                 230                 235                 240

Gly Lys Gly Asn Glu Pro Gly Thr Lys Val Gln His Cys His Tyr Cys
                245                 250                 255

Gly Gly Ser Gly Met Glu Thr Ile Asn Thr Gly Pro Phe Val Met Arg
            260                 265                 270

Ser Thr Cys Arg Arg Cys Gly Gly Arg Gly Ser Ile Ile Ile Ser Pro
        275                 280                 285

Cys Val Val Cys Arg Gly Ala Gly Gln Ala Lys Gln Lys Lys Arg Val
    290                 295                 300

Met Ile Pro Val Pro Ala Gly Val Glu Asp Gly Gln Thr Val Arg Met
305                 310                 315                 320

Pro Val Gly Lys Arg Glu Ile Phe Ile Thr Phe Arg Val Gln Lys Ser
                325                 330                 335

Pro Val Phe Arg Arg Asp Gly Ala Asp Ile His Ser Asp Leu Phe Ile
            340                 345                 350

Ser Ile Ala Gln Ala Leu Leu Gly Gly Thr Ala Arg Ala Gln Gly Leu
        355                 360                 365

Tyr Glu Thr Ile Asn Val Thr Ile Pro Pro Gly Thr Gln Thr Asp Gln
    370                 375                 380

Lys Ile Arg Met Gly Gly Lys Gly Ile Pro Arg Ile Asn Ser Tyr Gly
385                 390                 395                 400

Tyr Gly Asp His Tyr Ile His Ile Lys Ile Arg Val Pro Lys Arg Leu
                405                 410                 415

Thr Ser Arg Gln Gln Ser Leu Ile Leu Ser Tyr Ala Glu Asp Glu Thr
            420                 425                 430

Asp Val Glu Gly Thr Val Asn Gly Val Thr Leu Thr Ser Ser Gly Lys
        435                 440                 445

Arg Ser Thr Gly Asn
    450
```

<210> 10
<211> 414
<212> PRT
<213> Homo sapiens

<400> 10

```
Val Ser Leu Thr Gly Thr Lys His Asn Pro Phe Ile Cys Thr Ala Ser
  1               5                  10                  15
```

```
Phe His Thr Ser Ala Pro Leu Ala Lys Glu Asp Tyr Tyr Gln Ile Leu
            20                  25                  30

Gly Val Pro Arg Asn Ala Ser Gln Lys Glu Ile Lys Lys Ala Tyr Tyr
        35                  40                  45

Gln Leu Ala Lys Lys Tyr His Pro Asp Thr Asn Lys Asp Asp Pro Lys
    50                  55                  60

Ala Lys Glu Lys Phe Ser Gln Leu Ala Glu Ala Tyr Glu Val Leu Ser
65                  70                  75                  80

Asp Glu Val Lys Arg Lys Gln Tyr Asp Ala Tyr Gly Ser Ala Gly Phe
                85                  90                  95

Asp Pro Gly Ala Ser Gly Ser Gln His Ser Tyr Trp Lys Gly Gly Pro
            100                 105                 110

Thr Val Asp Pro Glu Glu Leu Phe Arg Lys Ile Phe Gly Glu Phe Ser
        115                 120                 125

Ser Ser Ser Phe Gly Asp Phe Gln Thr Val Phe Asp Gln Pro Gln Glu
    130                 135                 140

Tyr Phe Met Glu Leu Thr Phe Asn Gln Ala Ala Lys Gly Val Asn Lys
145                 150                 155                 160

Glu Phe Thr Val Asn Ile Met Asp Thr Cys Glu Arg Cys Asn Gly Lys
                165                 170                 175

Gly Asn Glu Pro Gly Thr Lys Val Gln His Cys His Tyr Cys Gly Gly
            180                 185                 190

Ser Gly Met Glu Thr Ile Asn Thr Gly Pro Phe Val Met Arg Ser Thr
        195                 200                 205

Cys Arg Arg Cys Gly Gly Arg Gly Ser Ile Ile Ile Ser Pro Cys Val
    210                 215                 220

Val Cys Arg Gly Ala Gly Gln Ala Lys Gln Lys Lys Arg Val Met Ile
225                 230                 235                 240

Pro Val Pro Ala Gly Val Glu Asp Gly Gln Thr Val Arg Met Pro Val
                245                 250                 255

Gly Lys Arg Glu Ile Phe Ile Thr Phe Arg Val Gln Lys Ser Pro Val
            260                 265                 270

Phe Arg Arg Asp Gly Ala Asp Ile His Ser Asp Leu Phe Ile Ser Ile
        275                 280                 285

Ala Gln Ala Leu Leu Gly Gly Thr Ala Arg Ala Gln Gly Leu Tyr Glu
    290                 295                 300

Thr Ile Asn Val Thr Ile Pro Pro Gly Thr Gln Thr Asp Gln Lys Ile
305                 310                 315                 320

Arg Met Gly Gly Lys Gly Ile Pro Arg Ile Asn Ser Tyr Gly Tyr Gly
                325                 330                 335
```

```
Asp His Tyr Ile His Ile Lys Ile Arg Val Pro Lys Arg Leu Thr Ser
            340                 345                 350

Arg Gln Gln Ser Leu Ile Leu Ser Tyr Ala Glu Asp Glu Thr Asp Val
        355                 360                 365

Glu Gly Thr Val Asn Gly Val Thr Leu Thr Ser Ser Gly Gly Ser Thr
    370                 375                 380

Met Asp Ser Ser Ala Gly Ser Lys Ala Arg Arg Glu Ala Gly Glu Asp
385                 390                 395                 400

Glu Glu Gly Phe Leu Ser Lys Leu Lys Lys Met Phe Thr Ser
                405                 410
```

<210> 11
<211> 387
<212> PRT
<213> Homo sapiens

<400> 11

```
Val Ser Leu Thr Gly Thr Lys His Asn Pro Phe Ile Cys Thr Ala Ser
  1               5                  10                  15

Phe His Thr Ser Ala Pro Leu Ala Lys Glu Asp Tyr Tyr Gln Ile Leu
            20                  25                  30

Gly Val Pro Arg Asn Ala Ser Gln Lys Glu Ile Lys Lys Ala Tyr Tyr
        35                  40                  45

Gln Leu Ala Lys Lys Tyr His Pro Asp Thr Asn Lys Asp Asp Pro Lys
    50                  55                  60

Ala Lys Glu Lys Phe Ser Gln Leu Ala Glu Ala Tyr Glu Val Leu Ser
65                  70                  75                  80

Asp Glu Val Lys Arg Lys Gln Tyr Asp Ala Tyr Gly Ser Ala Gly Phe
                85                  90                  95

Asp Pro Gly Ala Ser Gly Ser Gln His Ser Tyr Trp Lys Gly Gly Pro
            100                 105                 110

Thr Val Asp Pro Glu Glu Leu Phe Arg Lys Ile Phe Gly Glu Phe Ser
        115                 120                 125

Ser Ser Ser Phe Gly Asp Phe Gln Thr Val Phe Asp Gln Pro Gln Glu
    130                 135                 140

Tyr Phe Met Glu Leu Thr Phe Asn Gln Ala Ala Lys Gly Val Asn Lys
145                 150                 155                 160

Glu Phe Thr Val Asn Ile Met Asp Thr Cys Glu Arg Cys Asn Gly Lys
                165                 170                 175

Gly Asn Glu Pro Gly Thr Lys Val Gln His Cys His Tyr Cys Gly Gly
            180                 185                 190

Ser Gly Met Glu Thr Ile Asn Thr Gly Pro Phe Val Met Arg Ser Thr
        195                 200                 205
```

```
Cys Arg Arg Cys Gly Gly Arg Gly Ser Ile Ile Ile Ser Pro Cys Val
    210                 215                 220

Val Cys Arg Gly Ala Gly Gln Ala Lys Gln Lys Lys Arg Val Met Ile
225                 230                 235                 240

Pro Val Pro Ala Gly Val Glu Asp Gly Gln Thr Val Arg Met Pro Val
                245                 250                 255

Gly Lys Arg Glu Ile Phe Ile Thr Phe Arg Val Gln Lys Ser Pro Val
            260                 265                 270

Phe Arg Arg Asp Gly Ala Asp Ile His Ser Asp Leu Phe Ile Ser Ile
        275                 280                 285

Ala Gln Ala Leu Leu Gly Gly Thr Ala Arg Ala Gln Gly Leu Tyr Glu
    290                 295                 300

Thr Ile Asn Val Thr Ile Pro Pro Gly Thr Gln Thr Asp Gln Lys Ile
305                 310                 315                 320

Arg Met Gly Gly Lys Gly Ile Pro Arg Ile Asn Ser Tyr Gly Tyr Gly
                325                 330                 335

Asp His Tyr Ile His Ile Lys Ile Arg Val Pro Lys Arg Leu Thr Ser
            340                 345                 350

Arg Gln Gln Ser Leu Ile Leu Ser Tyr Ala Glu Asp Glu Thr Asp Val
        355                 360                 365

Glu Gly Thr Val Asn Gly Val Thr Leu Thr Ser Ser Gly Lys Arg Ser
    370                 375                 380

Thr Gly Asn
385
```

<210> 12
<211> 480
<212> PRT
<213> Homo sapiens

<400> 12

```
Met Ala Ala Arg Cys Ser Thr Arg Trp Leu Leu Val Val Val Gly Thr
  1               5                  10                  15

Pro Arg Leu Pro Ala Ile Ser Gly Arg Gly Ala Arg Pro Pro Arg Glu
             20                  25                  30

Gly Val Val Gly Ala Trp Leu Ser Arg Lys Leu Ser Val Pro Ala Phe
         35                  40                  45

Ala Ser Ser Leu Thr Ser Cys Gly Pro Arg Ala Leu Leu Thr Leu Arg
     50                  55                  60

Pro Gly Val Ser Leu Thr Gly Thr Lys His Asn Pro Phe Ile Cys Thr
 65                  70                  75                  80

Ala Ser Phe His Thr Ser Ala Pro Leu Ala Lys Glu Asp Tyr Tyr Gln
                 85                  90                  95
```

```
Ile Leu Gly Val Pro Arg Asn Ala Ser Gln Lys Glu Ile Lys Lys Ala
            100                 105                 110

Tyr Tyr Gln Leu Ala Lys Lys Tyr His Pro Asp Thr Asn Lys Asp Asp
        115                 120                 125

Pro Lys Ala Lys Glu Lys Phe Ser Gln Leu Ala Glu Ala Tyr Glu Val
    130                 135                 140

Leu Ser Asp Glu Val Lys Arg Lys Gln Tyr Asp Ala Tyr Gly Ser Ala
145                 150                 155                 160

Gly Phe Asp Pro Gly Ala Ser Gly Ser Gln His Ser Tyr Trp Lys Gly
                165                 170                 175

Gly Pro Thr Val Asp Pro Glu Glu Leu Phe Arg Lys Ile Phe Gly Glu
            180                 185                 190

Phe Ser Ser Ser Ser Phe Gly Asp Phe Gln Thr Val Phe Asp Gln Pro
        195                 200                 205

Gln Glu Tyr Phe Met Glu Leu Thr Phe Asn Gln Ala Ala Lys Gly Val
    210                 215                 220

Asn Lys Glu Phe Thr Val Asn Ile Met Asp Thr Cys Glu Arg Cys Asn
225                 230                 235                 240

Gly Lys Gly Asn Glu Pro Gly Thr Lys Val Gln His Cys His Tyr Cys
                245                 250                 255

Gly Gly Ser Gly Met Glu Thr Ile Asn Thr Gly Pro Phe Val Met Arg
            260                 265                 270

Ser Thr Cys Arg Arg Cys Gly Gly Arg Gly Ser Ile Ile Ile Ser Pro
        275                 280                 285

Cys Val Val Cys Arg Gly Ala Gly Gln Ala Lys Gln Lys Lys Arg Val
    290                 295                 300

Met Ile Pro Val Pro Ala Gly Val Glu Asp Gly Gln Thr Val Arg Met
305                 310                 315                 320

Pro Val Gly Lys Arg Glu Ile Phe Ile Thr Phe Arg Val Gln Lys Ser
                325                 330                 335

Pro Val Phe Arg Arg Asp Gly Ala Asp Ile His Ser Asp Leu Phe Ile
            340                 345                 350

Ser Ile Ala Gln Ala Leu Leu Gly Gly Thr Ala Arg Ala Gln Gly Leu
        355                 360                 365

Tyr Glu Thr Ile Asn Val Thr Ile Pro Pro Gly Thr Gln Thr Asp Gln
    370                 375                 380

Lys Ile Arg Met Gly Gly Lys Gly Ile Pro Arg Ile Asn Ser Tyr Gly
385                 390                 395                 400

Tyr Gly Asp His Tyr Ile His Ile Lys Ile Arg Val Pro Lys Arg Leu
                405                 410                 415

Thr Ser Arg Gln Gln Ser Leu Ile Leu Ser Tyr Ala Glu Asp Glu Thr
```

```
            420                 425                 430

Asp Val Glu Gly Thr Val Asn Gly Val Thr Leu Thr Ser Ser Gly Gly
        435                 440                 445

Ser Thr Met Asp Ser Ser Ala Gly Ser Lys Ala Arg Arg Glu Ala Gly
    450                 455                 460

Glu Asp Glu Glu Gly Phe Leu Ser Lys Leu Lys Lys Met Phe Thr Ser
465                 470                 475                 480


<210> 13
<211> 33
<212> PRT
<213> Homo sapiens

<400> 13
Gly Ser Thr Met Asp Ser Ser Ala Gly Ser Lys Ala Arg Arg Glu Ala
  1               5                  10                  15

Gly Glu Asp Glu Glu Gly Phe Leu Ser Lys Leu Lys Lys Met Phe Thr
             20                  25                  30

Ser


<210> 14
<211> 6
<212> PRT
<213> Homo sapiens

<400> 14
Lys Arg Ser Thr Gly Asn
  1               5


<210> 15
<211> 26
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
      peptide

<400> 15
Cys Phe Ile Thr Lys Ala Leu Gly Ile Ser Tyr Gly Arg Lys Lys Arg
  1               5                  10                  15

Arg Gln Arg Arg Arg Pro Pro Gln Gly Ser
             20                  25


<210> 16
<211> 12
<212> PRT
<213> Unknown Organism

<220>
<223> Description of Unknown Organism: EGF derived
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peptide

<400> 16
Cys Met His Ile Glu Ser Leu Asp Ser Tyr Thr Cys
1 5 10

<210> 17
<211> 12
<212> PRT
<213> Unknown Organism

<220>
<223> Description of Unknown Organism: EGF derived peptide

<400> 17
Cys Met Tyr Ile Glu Ala Leu Asp Lys Tyr Ala Cys
1 5 10

<210> 18
<211> 29
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic internalizing peptide

<400> 18
Glu Ala Ala Leu Ala Glu Ala Leu Ala Glu Ala Leu Ala Glu Ala Leu
1 5 10 15

Ala Glu Ala Leu Ala Glu Ala Leu Glu Ala Leu Ala Ala
20 25

<210> 19
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Illustrative peptide

<400> 19
Gly Asn Ala Ala Ala Ala Arg Arg
1 5

<210> 20
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 20

cgagacagat gtggagggga 20

<210> 21
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 21
gaataattta aacacact 18

<210> 22
<211> 36
<212> PRT
<213> Homo sapiens

<400> 22
Ser Ser Gly Gly Ser Thr Met Asp Ser Ser Ala Gly Ser Lys Ala Arg
1 5 10 15

Arg Glu Ala Gly Glu Asp Glu Glu Gly Phe Leu Ser Lys Leu Lys Lys
20 25 30

Met Phe Thr Ser
35

<210> 23
<211> 9
<212> PRT
<213> Homo sapiens

<400> 23
Ser Ser Gly Lys Arg Ser Thr Gly Asn
1 5

<210> 24
<211> 33
<212> PRT
<213> Homo sapiens

<400> 24
Gly Ser Thr Met Asp Ser Ser Ala Gly Ser Lys Ala Arg Arg Glu Ala
1 5 10 15

Gly Glu Asp Glu Glu Gly Phe Leu Ser Lys Leu Lys Lys Met Phe Thr
20 25 30

Ser

<210> 25
<211> 33
<212> PRT
<213> Mus sp.

<400> 25
Gly Arg Thr Met Asp Ser Ser Ala Glu Ser Lys Asp Arg Arg Glu Ala
1 5 10 15

Gly Glu Asp Asn Glu Gly Phe Leu Ser Lys Leu Lys Lys Ile Phe Thr
20 25 30

Ser

<210> 26
<211> 6
<212> PRT
<213> Homo sapiens

<400> 26
Lys Arg Ser Thr Gly Asn
1 5

<210> 27
<211> 6
<212> PRT
<213> Mus sp.

<400> 27
Lys Arg Ser Thr Gly Asn
1 5

<210> 28
<211> 479
<212> PRT
<213> Mus sp.

<220>
<221> MOD_RES
<222> (206)..(224)
<223> Unknown amino acid

<400> 28
Met Ala Ala Trp Cys Ser Pro Arg Trp Leu Arg Val Ala Val Gly Thr
1 5 10 15

Pro Arg Leu Pro Ala Ala Ala Gly Arg Gly Val Gln Gln Pro Gln Gly
20 25 30

Gly Val Val Ala Thr Ser Leu Cys Arg Lys Leu Cys Val Ser Ala Phe
35 40 45

Gly Leu Ser Met Gly Ala His Gly Pro Arg Ala Leu Leu Thr Leu Arg
50 55 60

Pro Gly Val Arg Leu Thr Gly Thr Lys Ser Phe Pro Phe Val Cys Thr
65 70 75 80

Thr Ser Phe His Thr Ser Ala Ser Leu Ala Lys Asp Asp Tyr Tyr Gln
85 90 95

Ile Leu Gly Val Pro Arg Asn Ala Ser Gln Lys Asp Ile Lys Lys Ala
100 105 110

```
Tyr Tyr Gln Leu Ala Lys Lys Tyr His Pro Asp Thr Asn Lys Asp Asp
        115                 120                 125

Pro Lys Ala Lys Glu Lys Phe Ser Gln Leu Ala Glu Ala Tyr Glu Val
    130                 135                 140

Leu Ser Asp Glu Val Lys Arg Lys Gln Tyr Asp Ala Tyr Gly Ser Ala
145                 150                 155                 160

Gly Phe Asp Pro Gly Thr Ser Ser Ser Gly Gln Gly Tyr Trp Arg Gly
                165                 170                 175

Gly Pro Ser Val Asp Pro Glu Glu Leu Phe Arg Lys Ile Phe Gly Glu
            180                 185                 190

Phe Ser Ser Ser Pro Phe Gly Asp Phe Gln Asn Val Val Xaa Xaa Xaa
        195                 200                 205

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
    210                 215                 220

Lys Glu Phe Thr Val Asn Ile Met Asp Thr Cys Glu Arg Cys Asp Gly
225                 230                 235                 240

Lys Gly Asn Glu Pro Gly Thr Lys Val Gln His Cys His Tyr Cys Gly
                245                 250                 255

Gly Ser Gly Met Glu Thr Ile Asn Thr Gly Pro Phe Val Met Arg Ser
            260                 265                 270

Thr Cys Arg Arg Cys Gly Gly Arg Gly Ser Ile Ile Thr Asn Pro Cys
        275                 280                 285

Val Val Cys Arg Gly Ala Gly Gln Ala Lys Gln Lys Lys Arg Val Thr
    290                 295                 300

Ile Pro Val Pro Ala Gly Val Glu Asp Gly Gln Thr Val Arg Met Pro
305                 310                 315                 320

Val Gly Lys Arg Glu Ile Phe Val Thr Phe Arg Val Gln Lys Ser Pro
                325                 330                 335

Val Phe Arg Arg Thr Cys Ala Asp Ile His Ser Asp Leu Phe Ile Ser
            340                 345                 350

Ile Ala Gln Ala Ile Leu Gly Gly Thr Ala Lys Ala Gln Gly Leu Tyr
        355                 360                 365

Glu Thr Ile Asn Val Thr Ile Pro Ala Gly Ile Gln Thr Asp Gln Lys
    370                 375                 380

Ile Arg Leu Thr Gly Lys Gly Ile Pro Arg Ile Asn Ser Tyr Gly Tyr
385                 390                 395                 400

Gly Asp His Tyr Ile His Ile Lys Ile Arg Val Pro Lys Arg Leu Ser
                405                 410                 415

Ser Arg Gln Gln Asn Leu Ile Leu Ser Tyr Ala Glu Asp Glu Thr Asp
            420                 425                 430
```

```
Val Glu Gly Thr Val Asn Gly Val Thr His Thr Ser Thr Gly Gly Arg
        435                 440                 445

Thr Met Asp Ser Ser Ala Glu Ser Lys Asp Arg Arg Glu Ala Gly Glu
    450                 455                 460

Asp Asn Glu Gly Phe Leu Ser Lys Leu Lys Lys Ile Phe Thr Ser
465                 470                 475


<210> 29
<211> 452
<212> PRT
<213> Mus sp.

<220>
<221> MOD_RES
<222> (206)..(224)
<223> Unknown amino acid

<400> 29
Met Ala Ala Trp Cys Ser Pro Arg Trp Leu Arg Val Ala Val Gly Thr
  1               5                  10                  15

Pro Arg Leu Pro Ala Ala Ala Gly Arg Gly Val Gln Gln Pro Gln Gly
             20                  25                  30

Gly Val Val Ala Thr Ser Leu Cys Arg Lys Leu Cys Val Ser Ala Phe
         35                  40                  45

Gly Leu Ser Met Gly Ala His Gly Pro Arg Ala Leu Leu Thr Leu Arg
     50                  55                  60

Pro Gly Val Arg Leu Thr Gly Thr Lys Ser Phe Pro Phe Val Cys Thr
 65                  70                  75                  80

Thr Ser Phe His Thr Ser Ala Ser Leu Ala Lys Asp Asp Tyr Tyr Gln
                 85                  90                  95

Ile Leu Gly Val Pro Arg Asn Ala Ser Gln Lys Asp Ile Lys Lys Ala
            100                 105                 110

Tyr Tyr Gln Leu Ala Lys Lys Tyr His Pro Asp Thr Asn Lys Asp Asp
        115                 120                 125

Pro Lys Ala Lys Glu Lys Phe Ser Gln Leu Ala Glu Ala Tyr Glu Val
    130                 135                 140

Leu Ser Asp Glu Val Lys Arg Lys Gln Tyr Asp Ala Tyr Gly Ser Ala
145                 150                 155                 160

Gly Phe Asp Pro Gly Thr Ser Ser Ser Gly Gln Gly Tyr Trp Arg Gly
                165                 170                 175

Gly Pro Ser Val Asp Pro Glu Glu Leu Phe Arg Lys Ile Phe Gly Glu
            180                 185                 190

Phe Ser Ser Ser Pro Phe Gly Asp Phe Gln Asn Val Val Xaa Xaa Xaa
        195                 200                 205

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
```

```
    210                 215                 220

Lys Glu Phe Thr Val Asn Ile Met Asp Thr Cys Glu Arg Cys Asp Gly
225                 230                 235                 240

Lys Gly Asn Glu Pro Gly Thr Lys Val Gln His Cys His Tyr Cys Gly
                245                 250                 255

Gly Ser Gly Met Glu Thr Ile Asn Thr Gly Pro Phe Val Met Arg Ser
            260                 265                 270

Thr Cys Arg Arg Cys Gly Gly Arg Gly Ser Ile Ile Thr Asn Pro Cys
        275                 280                 285

Val Val Cys Arg Gly Ala Gly Gln Ala Lys Gln Lys Lys Arg Val Thr
    290                 295                 300

Ile Pro Val Pro Ala Gly Val Glu Asp Gly Gln Thr Val Arg Met Pro
305                 310                 315                 320

Val Gly Lys Arg Glu Ile Phe Val Thr Phe Arg Val Gln Lys Ser Pro
                325                 330                 335

Val Phe Arg Arg Thr Cys Ala Asp Ile His Ser Asp Leu Phe Ile Ser
            340                 345                 350

Ile Ala Gln Ala Ile Leu Gly Gly Thr Ala Lys Ala Gln Gly Leu Tyr
        355                 360                 365

Glu Thr Ile Asn Val Thr Ile Pro Ala Gly Ile Gln Thr Asp Gln Lys
    370                 375                 380

Ile Arg Leu Thr Gly Lys Gly Ile Pro Arg Ile Asn Ser Tyr Gly Tyr
385                 390                 395                 400

Gly Asp His Tyr Ile His Ile Lys Ile Arg Val Pro Lys Arg Leu Ser
                405                 410                 415

Ser Arg Gln Gln Asn Leu Ile Leu Ser Tyr Ala Glu Asp Glu Thr Asp
            420                 425                 430

Val Glu Gly Thr Val Asn Gly Val Thr His Thr Ser Thr Gly Lys Arg
        435                 440                 445

Ser Thr Gly Asn
    450
```

<210> 30
<211> 453
<212> PRT
<213> Homo sapiens

<400> 30

```
Met Ala Ala Arg Cys Ser Thr Arg Trp Leu Leu Val Val Val Gly Thr
1               5                   10                  15

Pro Arg Leu Pro Ala Ile Ser Gly Arg Gly Ala Arg Pro Pro Arg Glu
            20                  25                  30
```

```
Gly Val Val Gly Ala Trp Leu Ser Arg Lys Leu Ser Val Pro Ala Phe
        35                  40                  45

Ala Ser Ser Leu Thr Ser Cys Gly Pro Arg Ala Leu Leu Thr Leu Arg
    50                  55                  60

Pro Gly Val Ser Leu Thr Gly Thr Lys His Asn Pro Phe Ile Cys Thr
65                  70                  75                  80

Ala Ser Phe His Thr Ser Ala Pro Leu Ala Lys Glu Asp Tyr Tyr Gln
                85                  90                  95

Ile Leu Gly Val Pro Arg Asn Ala Ser Gln Lys Glu Ile Lys Lys Ala
            100                 105                 110

Tyr Tyr Gln Leu Ala Lys Lys Tyr Gln Pro Asp Thr Asn Lys Asp Asp
        115                 120                 125

Pro Lys Ala Lys Glu Lys Phe Ser Gln Leu Ala Glu Ala Tyr Glu Val
    130                 135                 140

Leu Ser Asp Glu Val Lys Arg Lys Gln Tyr Asp Ala Tyr Gly Ser Ala
145                 150                 155                 160

Gly Phe Asp Pro Gly Ala Ser Gly Ser Gln His Ser Tyr Trp Lys Gly
                165                 170                 175

Gly Pro Thr Val Asp Pro Glu Glu Leu Phe Arg Lys Ile Phe Gly Glu
            180                 185                 190

Phe Ser Ser Ser Ser Phe Gly Asp Phe Gln Thr Val Phe Asp Gln Pro
        195                 200                 205

Gln Glu Tyr Phe Met Glu Leu Thr Phe Asn Gln Ala Ala Lys Gly Val
    210                 215                 220

Asn Lys Glu Phe Thr Val Asn Ile Met Asp Thr Cys Glu Arg Cys Asn
225                 230                 235                 240

Gly Lys Gly Asn Glu Pro Gly Thr Lys Val Gln His Cys His Tyr Cys
                245                 250                 255

Gly Gly Ser Gly Met Glu Thr Ile Asn Thr Gly Pro Phe Val Met Arg
            260                 265                 270
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Ser Thr Cys Arg Arg Cys Gly Gly Arg Gly Ser Ile Ile Ile Ser Pro
        275                 280                 285

Cys Val Val Cys Arg Gly Ala Gly Gln Ala Lys Gln Lys Lys Arg Val
    290                 295                 300

Met Ile Pro Val Pro Ala Gly Val Glu Asp Gly Gln Thr Val Arg Met
305                 310                 315                 320

Pro Val Gly Lys Arg Glu Ile Phe Ile Thr Phe Arg Val Gln Lys Ser
                325                 330                 335

Pro Val Phe Arg Arg Asp Gly Ala Asp Ile His Ser Asp Leu Phe Ile
            340                 345                 350

Ser Ile Ala Gln Ala Leu Leu Gly Gly Thr Ala Arg Ala Gln Gly Leu
        355                 360                 365

Tyr Glu Thr Ile Asn Val Thr Ile Pro Pro Gly Thr Gln Thr Asp Gln
    370                 375                 380

Lys Ile Arg Met Gly Gly Lys Gly Ile Pro Arg Ile Asn Ser Tyr Gly
385                 390                 395                 400

Tyr Gly Asp His Tyr Ile His Ile Lys Ile Arg Val Pro Lys Arg Leu
                405                 410                 415

Thr Ser Arg Gln Gln Ser Leu Ile Leu Ser Tyr Ala Glu Asp Glu Thr
            420                 425                 430

Asp Val Glu Gly Thr Val Asn Gly Val Thr Leu Thr Ser Ser Gly Lys
        435                 440                 445

Arg Ser Thr Gly Asn
    450
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